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ABSTRACT

The five papers in this collection examine the existing trends in the use of microcomputers in educational planning and management. In the first paper, "Reflexions sur l'Ordre du Jour" (French), Michel Saint-Germain addresses contextual factors surrounding the use of computers, priorities that must be accounted for before developing new software applications, and issues related to joint cooperation. In the second paper, "Computer (Software) Applications to Educational Planning and Management," Brent Edward Wholeben discusses trends in planning and management, priorities for software design and development, and cooperation between universities and specialized research centers. The education policy for international computing survey (in English and Spanish) is included. In the third paper, "Computer-based Educational Planning and Management in Africa: Current Trends," Boubacar Camara focuses on the growth of statistical applications and statistical databases, the design of information systems, and training workshops in computer literacy. In the fourth paper, "Software Application to Educational Planning: Notes on the Agenda," Habib Khan focuses on software applications to educational planning and the design and implementation of Education Management Information Systems. In the fifth paper, "Software Priorities for Educational Planning," Luis Valadares Tavares outlines the process of educational planning and notes the facets of that process that may be supported by appropriate software. (DB)

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ROUND TABLE

TABLE RONDE

SOFTWARE APPLICATIONS TO EDUCATIONAL PLANNING AND MANAGEMENT

APPLICATION DE LA MICRO-INFORMATIQUE A LA PLANIFICATION ET A LA GESTION DE L'EDUCATION

Reflexions sur l'Ordre du Jour
par
M. Saint-Germain

Computer (Software) Applications to Educational Planning and Management
by
B.E. Wholeben

Computer-Based Educational Planning and Management in Africa. Current Trends.
by
B. Camara

Software Applications to Educational Planning
by
H. Khan

Software Priorities for Educational Planning
by
L. Valadares Tavares

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ROUND TABLE III

COMPUTER (SOFTWARE) APPLICATIONS TO EDUCATIONAL PLANNING AND MANAGEMENT

A. Scope

The use of new information technologies has been recognized as a crucial factor for greater efficiency of educational planning and management. Although an inventory has not yet been made, it is known that there is a wide variety of micro-computer applications using different configurations and software resources.

The further development of these applications to educational planning and to educational management should be made on the basis of an articulated and cooperative effort. The recent "Inter-Regional Workshop on the Utilization of Micro-Computers in Educational Planning and Management" (Bangkok, 4-9 December 1989) was a first attempt in this direction. (This report will be distributed at the Congress).

Such a cooperative effort at the international level requires, in the first place, an assessment of the conditions according to which actual software applications are made in the framework of developing countries in relation to their major needs. On the other hand, it would be helpful if the main processes of planning and management (information, decision-making and implementation) were given priority as far as the conception of new software applications is concerned.

B. Objectives

The specific objectives of this round table are :

(i) A brief overview of existing trends in the use of micro-computers in educational planning and management.

(ii) The identification of priorities for new software applications.

(iii) The identification of modalities and the promotion of new opportunities for joint (horizontal) cooperation in this field.

C. **Agenda**

1. Software design and development

1.1 What requirements for improved software design and development with regard to educational planning and management (EPM).

1.2 New and better adapted training materials and methodologies regarding the use of software applications to EPM, including audio-visual materials.

1.3 Priorities for new software applications.

2. Modalities for joint cooperation

2.1 Identification of operational modalities for improved cooperation at all levels (networks, focal points, etc.).

2.2 Combining theory and practice : the links of universities and specialized training/research institutions with planning and management actors and institutions.

2.3 The development of specialized literature on education management information systems ; suggestions for an experimental review on EMIS to be published in 1991.

2.4 Advantages and usefulness of establishing international, regional, and sub-regional resource centers for training and technical cooperation.

D. **Organization**

The Division of Educational Policy and Planning of Unesco in cooperation with the University of Ottawa (Canada).

TABLE RONDE III

APPLICATION DE LA MICRO-INFORMATIQUE A LA PLANIFICATION ET A LA GESTION DE L'EDUCATION

A. But

L'utilisation de nouvelles technologies d'information a été reconnue comme un facteur essentiel à une meilleure efficacité de la planification et de la gestion de l'éducation. Bien qu'il n'y ait encore aucune liste exhaustive établie, il est connu qu'il existe une grande variété d'applications de la micro-informatique utilisant différentes configurations et ressources informatiques.

Le développement de ces applications pour la planification et la gestion de l'éducation devra se faire par un effort de coopération accru. La récente "table ronde inter-régionale sur l'utilisation de la micro-informatique dans la planification et la gestion de l'éducation" (Bangkok, 4-9 décembre 1989) est un premier pas dans cette direction (ce rapport sera distribué au Congrès).

Cet effort de coopération au niveau international nécessite, en premier lieu, que l'on définisse et répartisse les conditions d'application de la micro-informatique dans les pays en voie de développement selon leurs principaux besoins. De plus il serait utile que les processus de planification et de gestion les plus importants (l'information, la prise de décision et la mise en oeuvre) soient considérés comme prioritaires pour autant que la conception des applications nouvelles en micro-informatique soit prise en considération.

B. Objectifs

Les objectifs spécifiques de cette table ronde sont :

(i) Un rapide panorama des tendances actuelles concernant l'utilisation de la micro-informatique dans la planification et la gestion de l'éducation.

(ii) L'identification des priorités pour les nouvelles applications en micro-informatique.

(iii) L'identification des diverses modalités et le développement de nouvelles opportunités pour une coopération (horizontale) dans ce domaine.

C. La création de la micro-informatique et son développement

1.1 Les conditions requises pour améliorer la mise en place et le développement de la micro-informatique en relation avec la planification et la gestion de l'éducation (EPM).

1.2 De nouveaux matériels et de nouveles méthodologies de formation mieux adaptés à l'utilisation des applications de la micro-informatique à EPM, y compris le matériel audiovisuel.

1.3 Priorités pour de nouvelles applications de la micro-informatique.

2. Modalités pour une coopération commune

2.1 Identification des modalités operationnelles pour améliorer la coopération à tous les niveaux (les réseaux, les centres d'intérêt, etc...).

2.2 Combinaison de la théorie et de la pratique : les liens des universités et des institutions spécialisées dans la formation/recherche avec les acteurs et les institutions de la planification et de la gestion.

2.3 Développement d'ouvrages spécialisés sur les systèmes d'information de gestion de l'éducation ; suggestions pour une revue d'essai sur EMIS qui devra être publiée en 1991.

2.4 Avantages et utilité d'établir des centres (pour les ressources) internationaux, régionaux et sub-régionaux pour la coopération technique et la formation.

D. Organisation

La Division des Politiques et de la Planification de l'Education de l'Unesco en collaboration avec l'Université d'Ottawa (Canada).

REFLEXIONS SUR L'ORDRE DU JOUR

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a) Un survol des tendances actuelles dans le domaine de l'utilisation des micro-ordinateurs en gestion et planification éducationnelle.

Ma réponse est contextuelle. On remarque plusieurs tendances quant aux logiciels, à l'équipement, au concept d'exploitation et enfin à l'utilisation dans la formation et le perfectionnement.

1) Les logiciels sont de plus en plus performants et complexes. Ils demandent un équipement plus sophistiqué et rendent rapidement obsolètes des micro-ordinateurs encore utilisables. Il y a une nette tendance à l'intégration de logiciels qui offrent des services de nature différente (ex. traitement de texte, chiffrier et télécommunication). Leur manipulation devient plus complexe.

2) Si la configuration externe change peu (clavier, écran, ordinateur, imprimante, modem), la configuration interne évolue rapidement: capacité accrue de mémoire, vitesse d'accès, modem plus performants, imprimantes au laser, etc. Le résultat est un accroissement des coûts d'investissement et d'opération plus élevé ainsi qu'un accroissement phénoménal du rythme de remplacement. L'ordinateur tout comme le logiciel deviennent plus rapidement désuets. Le secteur public, particulièrement en éducation, n'a pas les argents nécessaires pour suivre l'évolution technologique. De plus, la tendance étant aux restrictions budgétaires, les remplacements ne sont pas progressifs. Ils surviennent alors en période de crise et obligent une restructuration complète du système avec les chocs

et contre-chocs propres aux changements majeurs de technologie.

3) Le concept d'utilisation passe d'une utilisation isolée à une utilisation en réseau. La fiabilité des lignes de communication, le développement des serveurs permet à plusieurs utilisateurs de micro-ordinateurs de partager des bases de données et des sorties (imprimante, autres micro-ordinateurs) communes tout en demeurant relativement autonomes.

Dans un tel contexte, les décideurs ont plus facilement accès aux données compilées (résultant des traitements d'organisation). Peu ont la possibilité d'utiliser les traitements de production. Ce qui fait que le micro-ordinateur, malgré ses possibilités étendues, est utilisé soit comme une machine à dactylographie perfectionnée soit comme une réservoir de données. Le problème est essentiellement au niveau de la formation et de la nécessité de dissocier les «systèmes d'information de gestion» de l'outil que constitue l'ordinateur. Il est d'ailleurs fréquent de trouver un personnel de secrétariat ayant une meilleure connaissance des possibilités du micro-ordinateur mais ne possédant pas le pouvoir de l'exploiter.

4) La tendance est de former des opérateurs de micro-ordinateurs plutôt que des utilisateurs de système d'information de gestion dont le pivot est le micro-ordinateur. Ces derniers sont habituellement utilisés à moins de 50% de leur capacité. Beaucoup de gestionnaires ne les utilisent que pour obtenir plus rapidement des données et encore, à condition que ça soit simple à opérer...et qu'ils en aient le temps. Les possibilités techniques sont très grandes mais on «pense» encore en fonction d'un papier, d'un crayon ou d'un livre.

Les sessions de formation sont habituellement accélérées et portent sur l'outil plutôt que sur le concept de système d'information de gestion. Quant à l'utilisation des micro-ordinateurs pour simuler des situations, il n'y a aucune pratique généralisée dans ce domaine: ça ne fait pas partie du mode de fonctionnement des administrations scolaires.

b) **L'identification des priorités pour de nouvelles applications de logiciels.**

On peut identifier quatre axes. 1-Il faut d'abord connaître les pratiques actuelles d'utilisation de logiciels et de formation. 2-Il faut voir comment on pourrait modifier ou enrichir ces pratiques. 3-Il faut développer de nouveaux

logiciels qui sont particulièrement adaptés aux conditions des pays en développement. 4- Enfin il faut accentuer le développement de programmes de formation à partir de logiciels conçus ou adaptés en fonction de la formation de gestionnaires ou de planificateurs.

1)Avant de définir de nouvelles applications, il faut faire analyser les résultats des enquêtes sur les pratiques actuelles. Il ne suffit pas, en fait, d'avoir une image de la situation, il faut dégager les tendances internes (propres aux systèmes éducatifs) et les tendances externes (propres au «monde» de la production de logiciels) telles qu'avancées dans la première partie. Les niveaux d'informatisation d'une part et de gestion de l'information d'autre part varient énormément selon les orientations choisies et l'équipement disponible.

2) Il faudra porter une attention particulière à l'intégration de cet outil dans le cadre des «systèmes d'information de gestion». L'un des nouveau domaines d'application est certainement une systématisation des traitements de production en fonction des besoins spécifiques des institutions éducatives, particulièrement dans les pays en développement comme, par exemple, les indicateurs d'efficacité de rendement du système ou encore les analyses temporelles. Il faut aussi tenir compte de la disponibilité des ressources. Le transfert de technologie et des pratiques associées (par exemple de ministères d'éducation de pays développés aux ministères d'éducation de pays en développement)devient alors presque impossible, compte tenu des différences majeures en ressources humaines, financières ou logistiques disponibles et aux coûts reliés aux systèmes informatiques. Il faut donc inventer des pratiques peu coûteuses mais toutefois fonctionnelles à partir de logiciels existants.

3) A la suite de l'identification des pratiques, des besoins d'information, des logiciels disponibles, on sera en mesure de déterminer s'il y a lieu de produire des logiciels spécifiques. Je pense qu'il y aurait lieu de se préoccuper surtout de logiciels de traitement de production (i.e. la transformation des données en informations) comme les coûts unitaires, les rapports et taux, les tendances et les approches comparatives. On pourra porter une attention particulière à l'intégration des lecteurs optiques pour les cartes géographiques et les bases de données dans le contexte de cartes scolaires informatisées.

4) De l'identification de ces pratiques potentiellement réalisables devraient découler deux blocs de formation. Le premier portera sur le processus de management d'un système d'information de gestion; le second sur la formation d'utilisateur. Dans le premier cas, il y aurait lieu de développer des logiciels de formation comme des simulations de produits et de processus, des jeux de gestions, des systèmes-experts de prise de décision. La simplicité et une orientation pédagogique devraient être les principes de base.

Dans le second cas, il faudrait développer des programmes de formation spécifiquement adaptés aux conditions d'opération des pays en développement, particulièrement ceux qui ne peuvent avoir accès à des systèmes informatiques puissants.

En somme, avant de développer de nouvelles applications, il faut faire un inventaire sérieux de la situation et miser sur la simplicité des processus et des outils. Il faut exploiter au maximum ce qui existe car le développement de logiciels est une entreprise complexe et coûteuse.

c) L'identification de modalités de fonctionnement et la promotion de possibilité pour une promotion conjointe (horizontale) dans le domaine.

1-Il faut identifier actuellement **qui fait quoi et comment** pour arriver à constituer un réseau d'intérêt qui tient compte à la fois des possibilités et aussi des moyens.

2-Il faut un **organisme central** qui coordonne, propose des priorités, anime le réseau, etc. L'UNESCO peut jouer ce rôle.

3-Il faut porter une attention particulière à l'équipement disponible et aux conditions d'opération. La différence est telle qu'il y a risque de développer du matériel pour une catégorie de pays, matériel qui serait inutilisable dans une autre catégorie.

4-Il faut se préoccuper du temps d'implantation et du temps nécessaire pour une formation complète. La mise en place de centres régionaux de développement et de formation ainsi que l'utilisation d'équipes de formation pourraient être des modalités intéressantes. Reste ouverte, comme toujours, la question des coûts...

COMPUTER (SOFTWARE) APPLICATIONS TO EDUCATIONAL PLANNING AND MANAGEMENT

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INTRODUCTION

The starting point for any discussion of issues related to educational planning and management requires an examination, initially, of philosophy. Philosophy, a basis from which all thought emerges, must include our cognitive conceptualization of management (control), service (assistance), assessment (monitoring), resources (budget), and production (performance). In the issue at hand, the application of computer technology to educational planning and management, the philosophy of technology must also be considered.

A guiding philosophy of technology is embedded in one's understanding and acceptance of three factors: (1) the utility of data for understanding policy and guiding practice, (2) the non-negative nature of the apersonalization of services provided for personal ends, and (3) the impact from substitution or replacement of traditional forms of service which new approaches promote. The significance of any achievements in the area of educational development, incurred through technological interventions within traditional planning and management processes, will be guided by common participation, understanding, cooperation, consensus, and consistency of purpose.

TRENDS IN PLANNING AND MANAGEMENT

The increased use of microcomputers in education has resulted in the parallel deployment of small-scale computing machinery for administrative ends, second in magnitude only to that of instructional computing. The trends associated with this increase in administrative computing, particularly in the areas of educational program planning and management, are problematic; furthermore, several of the trends present sources of recurring difficulties which must be summarily addressed and systematically remedied.

The first of these trends is, itself, the primary source of major difficulties in the use of computing machinery for planning and management; that is, the decentralizing of the computing source from mainframe to self-contained microcomputing workstation. This has led to disjointed data sources, restricted access to centralized databases, a decline in the flow of timely data to decision-makers, and therefore a loss in the validity and reliability of decisions by administrators which might have been enhanced by the availability of relevant information.

A second major trend lies in the functional inability of currently marketed, off-the-shelf software to emulate the operational demands of strategic planning, tactical control, and project (action) management. This lack of integrated software, which enhances administrative decision-making through the structured and interrelated application(s) of spreadsheets, databases, statistics, graphics, and multiple alternative analysis, significantly inhibits the ability of administrators to perform their duties responsibly.

A third trend, the direct result of the first and a by-product of the second, is the loss of information integrity associated with existing data sources and reporting systems. The reliability of the data collected individually and redundantly by remote uses, indeed the validity of the data variables identified and measured, depict a lack of quality control and security which is essential to any data gathering and information production activities.

SOFTWARE DESIGN AND DEVELOPMENT

The inability of currently decentralized operations to utilize computing effectively for educational planning and management identifies multiple requirements for an improved computing support modality. The problem does not lie in the philosophy of decentralization, but rather in the tangential by-products which accrue when decentralization is not accompanied closely by oversight functions of procedural standardization and product validation.

First, the now traditional reliance upon a management information system (MIS) approach to restructure data for administrative decision-making must be expanded to include the emerging philosophy of the decision support system (DSS), wherein (a) alternatives are suggested by the interaction between the problems (needs) identified and the information collected, and (b) both the feasibility and optimality of each alternative are evaluated through an analysis of the interaction between need identified and solution available.

Second, the demand for a functionally integrated approach to software for education planning and management, incorporating such key ingredients as database, statistics, and product optimization, must be accompanied by a philosophical integration which reflects the systemic elements of strategic planning, tactical control, and product validation. This approach must commence with the requirements of the needs assessment, and incorporate those aspects of monitoring, feedback, and renewal which are relevant to program development, implementation, evaluation and review.

Third, the long-term impact of strategic program planning and development, and the inter-disciplinary and/or cross-curricular relationships among separate programs throughout a region or nation, require a commonly supported, standardized approach to data analysis and information generation. When available and affordable, centralized computing allows real-time access to on-line transactional database entries and modifications, making any changes readily available to all users simultaneously. The advent of decentralized facilities and remote user (personalized) programming mandate a renewed interest in establishing standard operating modalities which insure intended practice and acceptable techniques.

Requirements for Improved Software Design and Development

The more recent improvements in software protocols for educational planning and management applications, particularly in the areas of sub-product integration (e.g., database, statistics, graphics, etc.), inter-program transferability (e.g., ASCII construction for retrieval by other independent software programs), and improved sub-program access (e.g., graphics' subroutine calls through programmed function "hot" keys), must be succeeded by the development of integrated software packages which emulate the philosophical process of strategic planning, tactical control, and product validation. Improved software in this regard would contain components related directly to each of the phases (functions) of program planning and evaluation: (1) assessment of needs, (2) statement of mission, and construction of supporting goals, objectives, and activities, associated with identified needs, (3) monitoring of program through-put and product output, (4) control of resource distribution based upon specific program component demand, and (5) validation of phases of program completion (product), with intervening feedback to the system for functional remediation and program revision. These components provide for tactical control without negatively precluding strategic flexibility.

Training Materials and Methodologies for Software Applications

The concurrent demands in a computing environment of decentralized planning and management with centralized mission control mandate an approach to training resource availability which includes the computing environment itself as a training conduit. The potential use of on-line listservers and bulletin boards as both training tools and solution solicitors highlights the fundamental initiatives found in the philosophy of distance learning. Special interest groups, questions regarding specific problems, and direct access to upper management as well as the product service component of the marketing vendor, are addressable directly through the decentralized system.

Priorities for New Software Applications

A readjustment of the traditional management information system approach to planning and management, wherein the actual decisions to be analyzed exist outside of the data-information computing process, must now be effectuated such that the various alternative decisions which are feasible exist directly within the computing process (viz. data-information-decision). Such a decision support system would prepare priority lists of potential actions from which the administrator would select, contingent upon the likely outcomes of each of the actions available. New software applications,

which simulate specific outcomes based upon discrete alternatives, rely upon many of the advances from artifical intelligence and linear optimization. Such software would systematically identify developing trends in the data, compare potential alternatives through simulation and optimization, and validate program components through pre-specified input-output relationships. This approach superimposes a medically-oriented model upon the planning and management process, conceptualizing the organization and its programs as a systemic entity. In effect, the organization of all data must be treated as a living organism, evolving and ever changing as it various components mature over time.

MODALITIES FOR JOINT COOPERATION

The success of decentralized computing resources to support the planning and management of educational programs, and ultimately reflect centralized philosophies of upper administration, lies in collaboration rather than competition. Collaboration must commence with participatory governance, be cross-disciplinary in focus, and remain internally invested at the lowest level of the organization.

Operational Modalities for Improved Cooperation at All Levels

Cooperation among modal operations is necessary to insure the selection of appropriate software, a consistency of software application for planning and management activities, and the reliability and validity of data required for such activities. Effective and efficient modalities assume strict coordination between superordinate and subordinate levels.

Cooperation is enhanced by four clearly defined elements under organizational control: (1) delineated responsibilities for personnel (e.g., job description), (2) articulated paths of communication between levels of the organization (e.g., superordinate-subordinate reporting linkages), (3) denoted support groups for information and problem resolution (e.g., special interest groups), and (4) a separate advisory body which is assigned the oversight function to serve as ombudsman in matters requiring interpretation of policy. This advisory body might also serve as a coordinating unit which would (a) articulate common outcomes, (b) identify relationships of shared accountability, and (c) monitor the impact of individual responsibilities. This final element, the advisory body, fulfills a useful educational service (technology) center role for insuring interaction and cooperation at all levels of the educational establishment.

Links with Universities and Specialized Training/Research Centers

Articulated relationships with institutions of higher education and related research centers further enhance the model of the educational technology center identified above. A technology service center orientation would make available a timely source for on-site consultancy, provision of specialized workshops and training seminars, and the potential host-node for any listserver and bulletin board access discussed previously. In addition, such a center could establish and maintain a centralized software clearinghouse related to educational planning and management requirements.

This center should be constituted with members of participating universities and regional/local educational agencies, and maintain an on-going research agenda related to computer applications for educational planning and management. Any agreement between universities and the service center would include (a) internships or practica for students, (b) release time for one or more professors to serve as on-site program developers and trainers on behalf of the center, and (c) the opportunity for faculty to switch roles with center professional staff in order to enhance job-alike experiences.

Literature on Educational Management Information Systems

A survey of policy priorities, illustrated by the example in the attached document and related to the development of policy for computer ethics, would identify a list of ranked priorities for further study. By requiring potential users to discriminate between competing policy objectives, a valid estimate of initial priorities for policy development would be available for review.

Pre-implementation policy developed as a result of this survey would provide initial guidelines for limited-scale field testing of planning and management software. Planning reports, implementation documents, and validation studies would continue to provide a source of literature-based information related to data systems for educational planning and management.

Coordinated Centers for Training and Technical Resources

The potential for Unesco to serve as an international coordinating organization in conjunction with the educational technology centers as regional advisory bodies within each political boundary is significant. Unesco would organize and provide coordinating activities for each participating member-nation, wherein the member would retain full control of all technologies (regional) centers within its boundaries, and where Unesco's primary function would be to serve as an information conduit to all members.

Attachments

Educational Policy for International Computing
(English version)

Curso de Accion Educativo en la Computacion Internacional
(Spanish version)

EPIC

Education Policy for International Computing

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Directions

Issues of ethics and equity, associated with the use of administrative and instructional data processing, are a growing international concern of professional educators. Within this instrument are listed, randomly, 52 declarative statements, each of which are stated as potential guidelines for ethical and equitable use(s) of the computer in education. Please review and evaluate these statements utilizing the following four (4) steps:

Step 1: Read *each* of the 52 statements carefully to familiarize yourself with their content and meaning.

Step 2: In the column labelled *20¢*, place an "X" in each of *20 boxes* which you feel should be components of a comprehensive policy statement on ethics and equity, whether specifically for individuals or more generally for the educational organization as a whole — insure that you *mark exactly 20 boxes only*.

Step 3: In the column labelled *10¢*, place an "X" in each of *10 'blanks,'* viz. "( )," which you feel are the "top ten" components of such a policy — please insure that you choose these "10" only from the "20" previously identified in Step 2, *marking exactly 10 blanks only*.

Step 4: In the column labelled *Rank*, place a number 01, 02, . . ., 10 in the space provided which indicates your ranking of importance of the *top ten* statements you *identified in Step 3* ['01' means "most important of the top-10" and '10' means "least important of the top-10"].

Complete the next two pages of this instrument according to initial directions (4 steps).

20# 10# Rank

- ☐ ( ) ___ Develop and communicate criteria for hardware used in education.
- ☐ ( ) ___ Evaluate software dealing with controversial activities or using a controversial methodology or paradigm to see whether it is appropriate for my students.
- ☐ ( ) ___ Evaluate the type of computer instruction being given and to whom it is being given. The evaluation will examine planned and unplanned outcomes, including changes in the roles of teachers, students and administrators.
- ☐ ( ) ___ Discourage and refuse to support unauthorized duplication of printed material related to copyrighted software.
- ☐ ( ) ___ Ensure that students have opportunities to evaluate their current and future roles and the impact their actions can have on future consequences in a computerized society.
- ☐ ( ) ___ Provide training to members of the educational or general community when asked and when practical in order to encourage parental involvement in long-term planning of computer use.
- ☐ ( ) ___ Allow for cooperative participation of teachers and administrators in selection of equipment.
- ☐ ( ) ___ Evaluate the quality of software for classroom use.
- ☐ ( ) ___ Analyze software for equitable gender and ethnic representation.
- ☐ ( ) ___ Ensure that my use of computers adequately reflects uses the student will have outside school now or in the future.
- ☐ ( ) ___ Encourage, through purchasing decisions, those vendors who make reasonable provisions for backup copies and multiple access.
- ☐ ( ) ___ Acknowledge the ethics of developers and vendors who adhere to truth in advertising and marketing, deliver a product that serves learners' interests and needs, and promotes equity.
- ☐ ( ) ___ Help students examine issues that relate to computer ethics.
- ☐ ( ) ___ Review the use of computer systems and networks to ensure appropriate confidentiality and privacy for all.
- ☐ ( ) ___ Participate in the selection of computer use goals.
- ☐ ( ) ___ Evaluate software in light of needs of prospective users and goals of school and community.
- ☐ ( ) ___ Strive to provide teachers with released time for computer training to a level of competency consistent with their projected use of computers.
- ☐ ( ) ___ Ensure that access to data bases does not exceed the limitations of use understood at the time the data were provided.
- ☐ ( ) ___ Help students learn to evaluate the models which underlie simulations on which major societal decisions are based.
- ☐ ( ) ___ Set standards for acquisition, development, and dissemination of hardware used in education.
- ☐ ( ) ___ Strive to provide opportunities for teachers to learn about future trends, possible impacts and consequences of a computerized society.
- ☐ ( ) ___ Judge where computers are and are not desirable in learning environments.
- ☐ ( ) ___ Plan hardware purchases that address longitudinal strategy for computer use in schools.
- ☐ ( ) ___ Participate in short/long-range plans to introduce and manage hardware and software in schools.
- ☐ ( ) ___ Teach those I supervise the legal and social responsibilities that attend collecting, manipulating, and disclosing data – in school and in society.
- ☐ ( ) ___ Encourage the development and maintenance of adequate support structures within the school district and region.

20# 10# Rank

- ☐ ( ) ___ Discourage and refuse to support unauthorized software duplication by students or educators.
- ☐ ( ) ___ When appropriate, provide teacher training for integrating computers into the curriculum and for the changes in curriculum that computer use brings.
- ☐ ( ) ___ Consistently evaluate effectiveness of computer use towards achieving my goals.
- ☐ ( ) ___ Respect privacy of others and exercise this right when handling computer-stored information.
- ☐ ( ) ___ Help students learn about future trends, possible impact and consequences of a computerized society.
- ☐ ( ) ___ Strive to see that all students have equal access to computers and computer related experiences, that students have such access no matter what their academic potential, ethnicity, gender, socio-economic group, or special education status.
- ☐ ( ) ___ Demonstrate respect for computer ethics in the school, which includes not permitting unauthorized duplication of software by my students.
- ☐ ( ) ___ Attempt to provide curriculum materials for computer use that will have meaning and appeal to all learning styles.
- ☐ ( ) ___ Support and encourage equitable computer use among departments and subject areas.
- ☐ ( ) ___ Evaluate what control donors should have over the use of hardware and software they provide.
- ☐ ( ) ___ Encourage funding for computers in schools according to a strategic integration plan.
- ☐ ( ) ___ Give attention to teaching students the ethics of computer use.
- ☐ ( ) ___ Provide training to members of the educational or general community when asked and when practical in order to coordinate expectations for computer use between home and school.
- ☐ ( ) ___ Help teachers keep up with current trends, research and literature related to computer developments affecting education and the curricular implications of these developments.
- ☐ ( ) ___ Support and encourage equity among schools in terms of availability and breadth of use of computer technology.
- ☐ ( ) ___ Consider likely future situations when making decisions about the pace and nature of computer integration.
- ☐ ( ) ___ Strive to obtain teacher training appropriate to needs for classroom use of computers.
- ☐ ( ) ___ Strive for computer literacy by both teachers and students.
- ☐ ( ) ___ Include planning for equitable management of computer resources.
- ☐ ( ) ___ Provide training to members of the educational or general community when asked and when practical in order to increase parental and community knowledge of possible educational goals that involve computers and of how these goals can be realized.
- ☐ ( ) ___ Strive towards integrating use of the computer, where appropriate, at all levels and throughout the curriculum.
- ☐ ( ) ___ Provide training to members of the educational or general community when asked and when practical in order to extend the standards of respect for copyright into school and community interactions.
- ☐ ( ) ___ Participate in evaluation of results of educational computer use.
- ☐ ( ) ___ Ensure that the curriculum addresses topics related to information technology.
- ☐ ( ) ___ Acknowledge the ethics of developers and vendors who adhere to truth in advertising and marketing, deliver a product that serves learners' interests and needs, make provision for after-sale maintenance and training, and promote equity.
- ☐ ( ) ___ Respect the efforts and expertise of hardware developers and vendors, particularly when they risk extending the uses of the computer.

CURSO DE ACCION EDUCATIVO EN LA COMPUTACION INTERNACIONAL

EPIC

Education Policy for International Computing

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Instrucciones

Emitidos de la ética y equidad, asociados con el uso del procesamiento de la información administrativa e instructiva, son una preocupacion en el ámbito internacional para los educadores profesionales. Contenido en este instrumento se encuentran, al azar, 52 relaciones declarativas, cada una formulada de tal manera que forman una guía potencial para el uso ético y equitativo de la computadora en la enseñanza. Favor de revisar y evaluar estas relaciones usando los siguientes cuatro (4) pasos a seguir:

PRIMER PASO: Lea *cada una* de las 52 relaciones cuidadosamente para que se familiarize con el contenido y significado de ellas.

SEGUNDO PASO: En la columna identificada con el número y símbolo 20#, ponga una "X" en cada uno de los *20 casilleros* que piensa que debieran ser componentes de un resumen del curso de acción comprensivo sobre la ética y equidad ya sea para el uso individual o generalizado dentro de la organización educativa en su entereza - asegurese que *marque 20 casilleros solamente.*

TERCER PASO: En la columna identificada con el número y símbolo 10#, ponga una "X" en cada uno de los 10 paréntesis en blanco "( )," que usted piensa son los "diez importantes" componentes de tal curso de acción - favor de asegurar de que ha escojido "10" solamente de los "20" previamente identificados en el SEGUNDO PASO, *marcando* exactamente 10 espacios en el blanco solamente.

CUARTO PASO: En la columna identificada *Rango*, ponga el número 01,02, . . ., 10 en el espacio proveido que indica el rango de importancia que le ha dado a las "diez importantes" relaciones que usted identificó en el TERCER PASO ("01" significa el más importante de los "diez importantes" y 10 significa "el menos importante de los "diez importantes").

Please respond to the following demography items before returning your instrument.

01 I have been a professional educator for _____ years. 2 1009

02 I have teaching experience in each of the following grades: (please circle *each grade* that applies)

K 1 2 3 4 5 6 7 8 9 10 11 12 12 +

(elementary) (secondary) (beyond)

03 I have teaching experience in each of the following curricula: (please check *each curricular area* that applies)

- ☐ Language Arts
- ☐ Reading
- ☐ Mathematics
- ☐ Science
- ☐ Social Studies
- ☐ Physical Education
- ☐ Health Education
- ☐ Special Education
- ☐ Speech Pathology
- ☐ Business Education
- ☐ Vocational Education
- ☐ Home Economics
- ☐ Computer Science
- ☐ Computer Literacy
- ☐ Foreign Language
- ☐ English as Second Language
- ☐ Bilingual Education
- ☐ Music Education
- ☐ Art Education
- ☐ Speech
- ☐ Drama
- ☐ Library Science
- ☐ Career Awareness/Exploration
- ☐ Military Science
- ☐ Other (please describe): _____

04 My understanding of how to use computers in the curriculum is: ☐ LOW ☐ MEDIUM ☐ HIGH

05 My level of current use of computers in my teaching is best stated as: ☐ LOW ☐ MEDIUM ☐ HIGH

06 My knowledge of computers in general is best stated as: ☐ LOW ☐ MEDIUM ☐ HIGH

07 Have you ever enrolled in any type of post-baccalaureate course of study? ☐ Yes ☐ No

If you answer **Yes**, then:

Which of the following areas was the main focus of post-baccalaureate study: (please check *one area* only)

- ☐ Education Administration
- ☐ Educational Psychology, Guidance, or School Counseling
- ☐ Curriculum and Instruction
- ☐ Health, Physical Education, Recreation, and Dance
- ☐ Other Generic Education Studies
- ☐ Liberal Arts
- ☐ Science
- ☐ Engineering
- ☐ Business or Management
- ☐ Library Science
- ☐ Other (please describe): _____

08 I have completed (approximately) _____ courses in post-baccalaureate study.

09 I have experience in each of the following administrative support positions: (please check *each position* that applies)

- ☐ Building or Campus Principal
- ☐ Building or Campus Assistant (Vice-) Principal
- ☐ School District Superintendent
- ☐ School District Associate/Assistant Superintendent
- ☐ Director (Supervisor) of Curriculum Area (please specify area): _____
- ☐ School Counselor (or other student personnel support staff)
- ☐ Registrar
- ☐ Educational Diagnostician
- ☐ Other (please describe): _____

10 My understanding of how to use computers for administrative purposes is: ☐ LOW ☐ MEDIUM ☐ HIGH

Complete las siguientes páginas de este instrumento de acuerdo con los (4) PASOS dados en el instructivo.

20# 10# Rango

- ☐ ( ) _____ Desarrollar y comunicar el criterio para el uso del equipo de computacion en la educación.
- ☐ ( ) _____ Evaluar la programación que trata con actividades controversiales o el uso de una metodología controversial o paradigma para ver si es apropiado para mis estudiantes.
- ☐ ( ) _____ Evaluar el tipo de instrucción del uso de computadoras impartido y a quien se le imparte. La evaluacion examinará los resultados planeados y sin planear, incluyendo cambios en las funciones de los maestros, estudiantado y administradores.
- ☐ ( ) _____ Disuadir y refutar el apoyo de la duplicación no autorizada del material impreso relacionado con programación protejida con los derechos de autor.
- ☐ ( ) _____ Asegurar que los estudiantes tengan oportunidad de evaluar papeles presentes y futuros, y el impacto que sus acciones puedan tener y sus consecuencias futuras en una sociedad computarizada.
- ☐ ( ) _____ Proveer capacitación a miembros de la comunidad de educadores o la comunidad en general cuando se les pregunte y cuando sea práctico para estimular la participación paternal en la planeación a largo plazo del uso de la computadora.
- ☐ ( ) _____ Permitir una cooperación y participación de los maestros y administradores en la selección del equipo.
- ☐ ( ) _____ Evaluar la calidad de la programación empleada en la sala de clase.
- ☐ ( ) _____ Analizar la programacion de una forma equiativa en terminos representativos de género y etnicidad.
- ☐ ( ) _____ Asegurar que el uso de la computadora refleje adecuadamente el uso que el estudiante dará fuera de la escuela en el presente o aplicará en el futuro.
- ☐ ( ) _____ Alentar a traves de decisiones de compra y venta, aquellos proveedores que hacen ajustes razonables para proveer documentos de apoyo y múltiple acceso.
- ☐ ( ) _____ Reconocer la ética del personal que desarrolla y a los proveedores que se adhieren a la verdad en la publicidad y mercadotecnia, entrega un producto que sirve a los intereses y necesidades de los aprendizes, y promueven equidad.
- ☐ ( ) _____ Ayudar a el estudiantado examinar los emitidos que se relacionan con la ética en la computacion.
- ☐ ( ) _____ Repasar el uso de sistemas y redes de computacion para asegurar la confidencialidad apropiada y privacia para el todo.
- ☐ ( ) _____ Participar en la selección de las metas de uso de la computadora.
- ☐ ( ) _____ Evaluar la programación sabiendo de antemano las necesidades de los prospectos que hacen uso y de las metas de la escuela y la comunidad.
- ☐ ( ) _____ Esforzarse para proveer a los maestros con la libertad de tiempo para capacitarse en computación, de llevarlos a un nivel de aptitud consistente con el uso proyectado de las computadoras.
- ☐ ( ) _____ Asegurar la accesibilidad a la banca de información no exceda los limites de uso entendido durante el tiempo en que la informacion fue proveeida.
- ☐ ( ) _____ Ayudar a los estudiantes aprender a evaluar los modelos que son la razón fundamental de las simulaciones en las cuales las decisiones mayores de la sociedad están basadas.
- ☐ ( ) _____ Establecer las normas para la adquicisión, desarrollo, y diseminación del equipo empleado en la educación.
- ☐ ( ) _____ Esforzarse para proveer oportunidades a los maestros en el aprendizaje de corrientes futuristicas, posibles impactos y consecuencias de una sociedad computarizada.
- ☐ ( ) _____ Juzgar donde las computadoras son o no son deseadas en los medio ambientes de aprendizaje.
- ☐ ( ) _____ Planear la compra de equipo que se enfocan en la estrategia a largo plazo, para el uso de las computadoras en las escuelas.
- ☐ ( ) _____ Participar en planes de corto y largo plazo para la introducción y administración del equipo y programacion en las escuelas.
- ☐ ( ) _____ Enzeñar aquellos bajo mi supervisión las responsabilidades legales y sociales que demandan la colección, manipulación y disposición de datos en la escuela y en la sociedad.
- ☐ ( ) _____ Alentar el desarrollo y mantenimiento de las estructuras propias de apoyo dentro del distrito escolar y la region.
- ☐ ( ) _____ Disuadir y refutar el apoyo en la duplicacion de programación no autorizada por estudiantes o educadores.
- ☐ ( ) _____ Cuando sea apropiado, proveer la capacitación del maestro para la integracion de las computadoras como parte del curriculum y para los cambios en el curriculum que el uso de la computadora trae en si.

International Congress
Planning and Management of Educational Development

Mexico 26-30 March 1990

Computer-based Educational Planning and Management in Africa current trends

by

Boubacar CAMARA

UNESCO-BREDA, Dakar

Computer-based Educational Planning and Management in Africa
- current trends -

I. General context

Since Independence up to mid 80's, most african countries have been using traditional educational planning and management based on manual procedures and a limited number of calculation methods including notably: determination of ratios, growth rates, and enrolment projection. During that period, significant achievements have been registered through the training of technicians and officers in charge of educational planning and management, in various domains: micro-planning & school mapping, education statistics production, central planning and administration.

However, in spite of all the efforts made, the Education Sector in Africa especially in sub-saharan Africa, is experiencing tremendous difficulties which express the ongoing severe economic and social crisis in the continent. As a matter of fact, the present Adjustment Debate reveals at least three major factors explaining the origin of the crisis: implementation of irrelevant development strategies, lack of appropriate planning and mismanagement. Thus, after 30 years of independence, some african countries particularly in the Sahel area, still have at the same time a net enrolment ratio less than 25% and an illiteracy rate more than 75%. Moreover, in Africa, the public expenditure on Education per inhabitant has decreased from 33$ in 1980 to 15$ in 1986

Concurrently, during the last two decades, the development of computer science and computer applications has made available, modern tools that can help in the improvement of the efficiency of education systems but also of the various sectors of the society. Specifically, the micro-informatics explosion in early 80's, has produced, accessible and cheap instruments for all kinds of utilities and particularly for educational planning and management. At the present time we are facing a challenging situation: on one hand the educational crisis is deepening; and on the other, new opportunities and potential means are provided by the scientific and technical revolution. Therefore, the key question is how to take into account the available technical achievements for the development of Education.

2. Introducing micro-informatics applications in Educational Planning and Management

One of the first areas of computer application to Education in Africa, is education statistics production. Most countries in the Region are involved in education projects financed generally by external funding bodies and other development agencies such as World Bank, SIDA, IDRC etc. Within these projects, the Planning units of the Ministries of Education are taking advantage of the training and equipment components by initiating the computerization of the statistics production activities as well as other activities relating to planning.

During the second half of the 80's, several countries have made important progress in establishing statistical data bases and publishing more regularly Education Statistics Yearbooks and bulletins. Among these countries one may mention few experiences in Ethiopia, Mozambique, Senegal and recently in Niger and Burkina Faso.

The setting up of data bases and dissemination of the outputs are concrete results of the computerization undertaken by many educational planning units of the continent. But with the new tool, growing needs appear in training in computer application to planning techniques, such as enrolment projection, modeling, simulation and also to all activities related to management: project and budget management, accounting, programming, evaluation, information management. the complexity of the education system and the various aspects of computer applications have led to an integrated approach with the concept of Education Management Information System (EMIS), and to a step by step implementation of the computerization process.

As pointed out by the sub-regional consultation[1] meeting on computer applications to educational planning and management held in Nazareth (Ethiopia) in October 1988, two stages are defined in the computerization process on the basis of the experiences analyzed during the consultation: the first stage relates to the computerization of education planning services for educational database management, enrolment projections and simulation. According to the type of organization adopted, the micro-computers are used separately or linked to form a local network. The second stage of computerization deals with the building of a computerized educational management information system which covers the education system as a whole including both formal and non-formal sectors.

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[1] Final Report, Sub-regional Consultation meeting on Computer application to educational planning and management, Nazareth, October 1988. UNESCO-BREDA; Moe, Ethiopia.

However, setting up a computerized educational management information system requires a preliminary study of system design, equipment & software, human resources, organization and maintenance. This stage corresponds to a high level of computerization which needs well trained computer scientists and technicians, and the development of relevant software applications to educational planning and management. As a matter of fact, the implementation of such a system must be based on powerful equipment at a mini and mainframe level.

Therefore, one has to consider the present context of limited generated resources for the development of education, in the implementation of a comprehensive educational management information system at short and medium term. Even if external financing is provided, recurrent costs and national contribution must be paid due attention.

In addition to the efforts made at national levels for introducing computer applications in educational planning and management, the Unesco Regional Office for Education in Africa (BREDA) has been developing since 1984 new services in the use of modern technologies of information and communication for the development of Africa Education systems. Within the framework of the Statistical Data bank concerning the Development of Education in Africa, BREDA has implemented several activities such as:

- the publication of a regional bulletin of education statistics which may facilitate the exchange of experience among african countries, in the field of computer-based educational planning and management, as the bulletin contains not only data for dissemination but also articles related to different aspects of computerization of educational activities;

- the conception of a simulation model named SIGEPRA,[1] simulation model for the generalization of Primary Education in Africa. The model is designed as an educational planning tool aimed at contributing to the definition of means, the evaluation of efforts and actions undertaken with a view to eradicating illiteracy according to the integrated approach adopted by the 1982 Harare Conference of Africa Ministers of Education and those in charge of economic planning.

[1] SIGEPRA Model, BREDA 1985, PUB/PMF/07

Hence, in the process of the preparation of integrated plans for the eradicanon of illiteracy, SIGEPRA is a model proposed that can help, according to various inputs related to Education budget, classroom building by public and private sectors and local communities, literacy centres both public and private, certains ratios such as expected efficiency ratios, in formal and non-formal sectors etc., to derive the corresponding gross enrolment ratio, illiteracy rate and global annual cost of the integrated plan.

The model has been simplified to take into consideration the limited up-to-date information available on Africa education systems, especially in the non-formal sector. SIGEPRA has been designed on a spreadsheet package using a simulation technique adapted to the software.

The model has been tested and used at three important occasions namely during the three regional training workshop organized on the preparation of integrated plans for the eradication of illiteracy. Up to now, twenty-one countries of the region have participated in the training workshops and for each one, the model has been used on the basis of the national information document available.

In order to provide more efficient support to Member States, training manuals and information documents have been prepared and disséminated: guide for the simulation on micro-computer, booklets containing a selection of indicators related to education etc.

More recently, in the area of computer literacy and computer based training for educational planners, managers and administrators, BREDA has published a book[1]: Micro-informatics and educational planning & management in Africa.

Advisory missions are also organized to assist Member States in the computerization of educational services, and particularly in the training of technicians and officers in charge of educational planning and management. Training workshops have been organized both at sub-regional and national levels (Bangui, Addis Ababa, Bamako, Dakar, Praïa etc.). For a systematized approach of the activities indicated on Computer applications, the Regional Office has prepared a project proposal, entitled: "Programme for the development of micro-informatics applications to Education Statistics production, planning and management" mainly for the benefit of Africa Least Developed Countries

[1] Micro-informatique, gestion et planification de l'Education en Afrique. UNESCO-BREDA, octobre 1989

which represent more than two-third of total World LDC's. The objectives assigned to the three-year project which has been submitted are:

- efficient use of micro-computers in educational administration activities: education statistics production, management and planning;
- regular publication of statistical bulletins and yearbooks;
- more studies on the development of education systems;
- frequent use of simulation models in planning and management activities;
- improvement of services provided by educational administration
- availability of manuals relating to the use of micro-informatics in education statistics production, management and planning.

These objectives reflect the urgent needs within the region for sub-regional, regional and international technical cooperation in the use of modern technologies precisely of micro-informatics for the development of Educational & planning and management, and above all for the development of Education.

3. New needs, new trends: the requirements of the 90's

If necessity is the mother of invention, one may say that necessity in the field of Education has to give birth to necessary innovative reforms, to new relevant approaches in different aspects of educational development. Faced with crucial problems and bottlenecks, African countries are trying to get solution to their situations. Several initiatives have been taken to analyze and formulate proposals during the last decade. Among these initiatives, it is worth mentioning: the Lagos Plan of Action (1980), the Harare Conference (1982), the Priority Programme for the Economic Recovery of Africa (PPERA) (1986) and Adjustment for transformation, an african blueprint for sustainable development (1989).[1]

With the starting decade, educational specialists must find out the main requirements for the real development of Education in Africa. As we know, planning or management is not an end per se; it is a means for educational development purpose. Thus, when we want to plan or manage, there are key questions we have to answer: *What to plan or manage, for whom, how and when?* More often these understood questions are forgotten. During the past decades, Educational Planning and management in most african

[1] Adjustment for transformation, an african blue print for sustainable development, ECA, Addis Ababa 1989.

countries have hot considered enough the content of Education and the quality of the final output. And now, with the available computer facilities, are we going to plan for the same content and the same orientation in Education? In fact, educational planners and managers should be fully aware of the necessary reforms and approaches for the development of education.

Moreover, when dealing with computer application to educational planning and management, we have to consider also how the same technology can contribute to the improvement of the quality of Educational output, to make Education more relevant, more useful to the development of the society. Consequently computer application to educational planning and management must not be separated from computer application to learning and teaching . This point stands as an important requirement of the 90's notably for vocational, technical and scientific learning and training.

As far as the requirements of the 90's in Africa are concerned, three outstanding needs must be noted:

- democratization;
- innovation and
- integration.

In the process of useful computer-based education planning and management these three key points are determining.

Fortunately, there is a growing awareness at the international level, of the new needs and new requirements for the development of Education and Human resources. The International Congress on Education and Informatics, held in Paris in April 1989, the Regional Consultation meetings for Education for All in Nairobi and Dakar, November 1989, and the World Conference on Education for All, held in Jomtien, March 1990, witness to a certain extent both awareness of the new requirements for the 90's and the importance of the three above mentioned points.

For the 90's in Africa, the world is rediscovering integrated development at grassroot level, the place and role of non-formal education as well that of informal sector in economic, social and cultural development. Furthermore the concept of basic education for all tends to confirm the need for democratization and integration since all components of Education are complementary and interdependent, and indeed available resources are limited. The concept includes also the innovation aspect, for the mere reason that traditional approaches and policies have failed.

With respect to these considerations, the following specific needs are defined:

- development of computer literacy and computer-based training for educational planners, managers and administrators;
- installing and efficient operation of shared educational data bases at national, sub-national and local levels;
- Development of appropriate software packages for various aspects of Educational planning and management;
- relevant regular training activities for trainers and specialists on well-adapted planning and management techniques.

As said before, the use of computer has increased the needs for more appropriate and sometimes more sophisticated planning and management methods that are difficult and even impossible to handle manually, particularly in multifactorial analysis, modeling, simulation , sampling technics, dynamic programming etc. Now, there is an urgent need to train technicians not only in computer application to planning and management, but also to increase their knowledge and know-how in planning and management techniques. This is a significant requirement due to the complexity of the educational and overall crisis. It is a great challenge to undertake these training activities and to disseminate the relevant methods and techniques at all levels including grass root levels.

Planning and management for a new type of Education oriented to real development, for the benefit of all populations not for an elite, with innovative methods, from now on, might be the answer to the questions asked earlier. But, why from now on?, because simply as the proverb says: a stitch in time saves nine. Therefore, let us try our best to begin changes and innovations step by step.

4. Areas of fruitful regional and international cooperation

A wide range of recommendations have been made at regional and international levels, with the Regional Consultation meeting on Computer Application to Education in Africa held in November 1984 in Abidjan,[1] the sub-regional consultation meeting on computer application to educational planning and management, already noted, and the

[1] Rapport final : Consultation régionale sur l'application de l'informatique dans l'Education. Abidjan, novembre 1984, UNESCO-BREDA.

International Congress Education and Informatics on the theme "Strengthening international Cooperation".[1]

On the basis of the relevant recommendations already made and the need for an integrated approach for the optimal use of resources and means that could be available, the following areas of fruitful regional and international cooperation are determined:

- creation and efficient operation of a regional centre in Africa dealing with all aspects related to computer application to education including namely planning and management aspects as well as pedagogical aspects. This centre will act not only as a diversified data base of various aspects of the relation "Education and Informatics" but also will deal with coursewares, educational planning and management softwares productions, dissemination of information, training of trainers and specialists in computer-based educational planning and management, and also in computer-based learning and teaching.

Such a centre will be of great utility for Africa Member States in their efforts to solving development problems especially in the area of human resources development.

The second area of fruitful cooperation proposed is:
- the implementation of a regional project for the development of micro-informatics application to education statistics production, planning and management particularly in Africa least developed countries.

As regards the growing needs in the domain mentioned, a systematized approach in providing support to Education Services in Africa is necessary. The regional centre could contribute to the achievement of the Project objectives.

- Networking and exchange of information at the international level constitute also a fruitful area. Close cooperation between Computer Scientists associations, Educational professionals associations and micro-computers users' association stands as a promising area of cooperation for the development of Education. The setting up and reinforcement of networking facilities should be given great consideration in the 90's. In Africa this networking component is a matter of concern since the continent has to avoid marginalisation.

[1] Final report and proceedings: International Congress : Education and Informatics, Paris, April 1989.

Subsequently to the above proposals, cooperation in the area of computer literacy and specialized literature on computer-based educational planning and management will contribute also to consolidating outcomes and results of the activities undertaken. The cultural background of Educational professionals, of workers in society is a crucial fact in the implementation of Development activities. Therefore, increasing the level of scientific culture of the professionals, and of the society, becomes a priority.

In conclusion, the development of computer-based educational planning and management, when combined with relevant innovative educational policies and strategies is a powerful means for the development of Education, of human resources in the African continent which is looking for solutions to the deep educational, economic, cultural and social crisis. Within this prospective, International cooperation, added to national, sub-regional and regional efforts, can help a lot in overcoming various difficulties and obstacles, and achieving significant progress in Education all along the present starting decade.

B. CAMARA
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SOFTWARE APPLICATION TO EDUCATIONAL PLANNING

NOTES ON THE AGENDA

Habib Khan
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Soft- Ware Application to Educational Planning

Notes Habib Khan [1]

Introduction:

1. In these notes, I shall broadly focus on the use of IT in EMIS and the application of models in educational planning. In discussing the situation I am drawing from my experience of carrying out the first EMIS experiment in Pakistan and the knowledge acquired at Harvard in building EMIS and the use of models in educational planning and the outcome of personal discussions with friends and colleagues in this field.

2. It is reported that about 20 percent of national budgets in developing countries is now allocated to the education sector. Slight lapses in estimating educational costs could have enormous economic and political effects (Theisen, 1988) But computing human and financial inputs to education systems requires data. And data is, unfortunately incomplete for policy and planning purposes. Whatever data is available is neither accurate nor timely. The first consideration, therefore, relates to availability and use of data in policy making and planning of education.

3. On the utility of data and analysis in the educational system of Pakistan, Prof Carol Weiss of Harvard reports "...one reason that officials say they do not use educational data is because the data are poor. And one reason that data do not improve is that no body uses them very much... the bureaucracy does not have the authority to make some of the decisions for which data could provide directions." Strategic decisions in many developing countries appear to be based not on information but on intuition, political association and social criteria set by the policy maker.

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[1] Habib Khan is a D.Ed candidate,(Administration Planning and Social Policy) at Harvard University, Cambridge, Massachussets, USA. His interests include developing Education Management Information Systems and Simulation Models to improve educational planning services of the developing countries.

The prime interest here is how best to design a viable EMIS given these conditions?

4. Some countries are experiencing the "Hi Tech" spill over effect as a result of computerization, which has no doubt improved the manageability of data bases and has overcome many problems associated with storage and processing, but this process, apparently has been dominated by technical personnel (TP). Data analysts or TPs produce reports without regards to the needs of policy makers, as a result the users have become TP dependent. The situation can be described as lack of understanding or perhaps ignorance on part of TPs and correspondingly a luke warm interest of the top management. The third challenge is based on an urgent need to establish communication between the policy maker and data analysts and others involved in the process.

5. Data available somewhere in the statistical bureaux, in a variety of designs, is utilized by various users. We have little knowledge as how data works when it is presented to a potential user. Is it the text, tables, graphs, description or some other format which is more attractive to the user. Research is needed to explore effective procedures and techniques of information presentation to decision-makers:this is the fourth concern.

6. Experience gained through Harvard Project BRIDGES in five countries tells us that the success or failure of EMIS is dependent on whether decisions are made in an informed way or by intuition. Unless the habit of analytical decision making is inculcated at the Ministry of Education level, it is not likely to reap the fruit of EMIS. With regard to building EMIS, we should address the following three sets of questions in a systematic manner:

1: How shall we envisage computerization while aiming to enhance the capacity of dealing with large data bases within the education system ?

2: How best can we educate and train users at different levels to make the best use of what IT offers ?

3: How to make the best use of PC based models?

6.1. Let me briefly reflect upon these points: First "while designing MIS for education, the major objective should be that it responds to the needs of the decision and policy-makers by providing relevant, timely and reliable data and contributes to more efficient and effective resource utilization. Among other features, MIS shall also respond to the following information:

a: Administration

b: Planning and Monitoring

c: Policy analysis and research.

An EMIS needs not be computerized, to be effective. But it is generally agreed that computerization offers potentially significant advantages over manual systems in large complex organizations like MOE. Computerization of EMIS facilitates the use of sophisticated models: for projection and as analytical tools, and report generators." After the conceptual model is drawn and all its prerequisite of three Ms -- money men and materials are worked out, "the best strategy for EMIS implementation is the one which seeks the involvement of local users in every stage of planning, designing and training to create a system which realistically meets what users view as their local needs". (Cassidy, 1989)

6.2. Second regarding implementation of EMIS, a gradual approach is far favored over the turn-key approach. Ideally a comprehensive and decentralized EMIS should commence at the school level. School Information System can successfully be net-worked at various levels: i.e.,at school district level which could be further integrated into a regional/national information systems. In such a system Principal of secondary schools can have an independent information systems and make use of enrollment and resource projection models etc. For example in the Massachusetts MMS ,the Modular Management System for Schools (a popular package) is in practice. The Superintendent of Schools can down load the information required for his/her use and vice versa.

7. The second set of questions is associated with Training strategies. Innovative strategies shall be devised for training of MIS personnel - both generators and users at various levels. The overall focus of attention for MIS "generators" would center on understanding and catering for the needs of policy makers and planners; data base management, analysis and the use of simulation models. Whereas the various level users should be prepared in the use of computerized MIS. Equipping educational planners with skills and techniques required to make best use of computer power and simulation resources within an EMIS, will require innovative training strategies.

All member countries should join hands together and pool expertise in this field and devise compatible strategies under bilateral, inter-regional cooperation programs. UNESCO in collaboration with other agencies for international development and foundations can play a vital role in facilitating such cooperation.

8. The challenge ahead of us revolve around these three points:

a: How to make available expertise in EMIS to the member countries of UNESCO in designing locally appropriate MIS;

b: How to make use of the experiences of other member countries; and

c. How to reinforce and equip UNESCO EMIS services both at the HQ and the Regional levels and acquire the required resources for its new role as a catalyst in this process .

9. My final point is related to models. As the development of computerized education Management Information System has progressed, there is a gradual trend towards the use of simulation models at various levels of the system. With the advent of PCs the crucial problem, in the use of models, such as high cost and the dilemma of programming skills has been cut down to the lowest level. Until recently planners had access to one kind of models, the Algorithmic or Projection Models which have been designed to address quantitative and mathematical issues of educational

planning. Today with the efforts of Harvard Graduate School of Education and as a result Project BRIDGES the heuristic models or "Policy Dialogue Facilitating Models" for use on PCs are fast emerging. These models address broad and open ended problems, between planners and policy makers, such as setting goals and objectives. Last year I had the honor to present the first heuristic model OPES (Optimizing Policies for Education Systems) at the Bangkok Conference. Now I wish to inform this symposium that three the following three models will be soon be completed:

a: EIM: Educational Impact Model. It uses data from 70 different countries and it tells the user that investment in one policy variable affects various indicators of the social sector.

b: SHARE: System to Help Access Reports of Effective Education. SHARE is an information data base that provides educators access to empirical research, theoretical studies and literature reviews on specific goals and policies.

c: EPICS:Education Policy Simulation was created to model and simulate the dynamics of educational policy making and planning. EPICS provides an environment to which to experience and experiment with fundamental concepts and issues in planning for educational change. The scenario provides an opportunity to explore the interrelationships among factors concerning school access and retention rates at various levels using quantitative and qualitative data.

Prof Russel Davis of Harvard predicts that these models will replace the currently popular mathematical models, whereas Prof McGinn of Harvard believes that "Simulations (models) can be excellent teaching devices. Students can experiment with sets of data and policies and program and observe likely effects on the performance of the system, all within a short period of time. New data can be entered and important variables can be changed to simulate at different education system".

10. The BRIDGES models were developed to address specific

problems in point -- such as the problem of access, equity, teachers, quality and costing of education. For instance the STEP model deals with projections and costing of educational plans and contains an interactive data base which allows the user to compare various country wise scenarios. The GENDER model addresses disparity of females in terms of access to education of the genders across the developing world. The non BRIDGES models are different in some respects -- the most important feature which they lack is the power of interactive data bases. I do not intend to sound prejudiced or be-little the importance of such models. But when I look at all these models from the users' perspective -- who urgently needs a package, for instance to simulate various scenarios, which model should s/he pick, what criteria or guidelines be considered or whom should s/he consult. At this point, unfortunately there is very little to guide the user. <u>There is, therefore, a pressing need to investigate to compare and contrast the various models and produce something similar to the evaluation of the commercially available products</u>. In this context Unesco could approach universities, other organizations and individuals for collaboration in this endeavour.

11. The wide variety of inter-related software packages which enter the market makes the selection of appropriate, moderately priced and most relevant package extremely difficult. Among spreadsheet and data base packages one finds half a dozen SW in each category. A case in point: the BRIDGES project used RBase in Pakistan and Egypt partly because of its strong Query Language Programming facility. From the BRIDGES point of view RBase proved an effective tool as Data Base management in these countries. But from the Egyptian perspective RBase could not deliver the goods because it cannot be modified to accommodate Arabic language. Interestingly Paradox offers a solution to this problem. The lesson that we learn from this experience is that the users needs should be the main criteria for selecting a package.

12. Finally we should not overlook the fact that computers and models do not give us a solution or an answer to our problems. They simply offer different possible pictures to us. In fact it is the user and <u>not</u> the computer to chose the alternatives and measure the consequences to make informed and intelligent judgement. We must not be seduced into believing that computers and models can solve all our policy and planning problems. Computers are only tools to help planners to carry out what they can only conceptualize.

SOFTWARE PRIORITIES FOR EDUCATIONAL PLANNING

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SOFTWARE PRIORITIES FOR EDUCATIONAL PLANNING

1 - The process of planning is heavily dependent on the quality, timing and volume of available information about the educational system and the exogenous societal variables.

2 - Traditionaly, such information has been extracted from data systems designed to fill up administrative or demographic/accounting objectives. Unfortunetely, these systems can hardly meet the needs of the processes of decision-making.

3 - The impressive and recent progress of micro-informatics is permitting the development of data-bases specially designed and built to fill up the needs of the educational planner.

4 - Construction of these information system implemented on micro equipment and easly handled by the planners is, no doubt, one of the highest priority classes of software Education Planning.

5 - Many other facets of the process of planning can be then supported by appropriate software such as:

- Forecasting of demographic trends
- Construction of societal scenarios
- Forecasting of manpower needs in terms of the economic progress.
- Resource allocation for strategic programs
- Project assessment, planning, management and appraisal
- Multi-criteria decisions aid
- School outcomes modeling
- Monitoring and control
- Planning of teachers training

6 - All these different types of software should be conceived in terms of the needs of the political, organizational and technical process of planning rather than in terms of the expertise on Informatics if successful implementation is aimed.

This means that the planners should be directly envolved in the process of model discussion and software design from the very early stages of work instead of being considered final "users" to whom the product should be presented.

7 - Participation of planners and discussion between multiple actors implies common frames of reference, standard languages and specifications, opportunities for open presentation and evaluation. Hence, the following action lines can greatly contribute to the development of educational planning software aids:

- Recommendation of international standards

- Open forum to train planners on these tools

- Clearinghouse for planning models

- Clearinghouse for software

In this context, UNESCO can play a proeminent role to promote the international cooperation in this domain.

I suggest that the feasibility and the choice of the most convenient approach to be adopted to implement each of these action lines should be subject to discussion during the roundtable.